CLAIMS

WHAT IS CLAIMED:

1. A method for modeling an object in software, comprising:

generating a three-dimensional geometry of the object from a plurality of points obtained from a plurality of images of the object, the images having been acquired from a plurality of perspectives; and

generating a three-dimensional model from the three-dimensional geometry for integration into an object recognition system.

2. The method of claim 1, wherein creating the three-dimensional geometry includes generating the three-dimensional geometry of the object from a plurality of points obtained from a plurality of two-dimensional images of the object.

3. The method of claim 2, wherein creating the three-dimensional geometry includes generating a set of three-dimensional data from a set of two-dimensional images.

4. The method of claim 3, wherein generating the set of three-dimensional data includes:

selecting a plurality of points in each of the two-dimensional images;

calibrating the relationship between the images from selected points that are co-located in more than one of the two-dimensional images; and

mapping the selected points in the calibrated two-dimensional images into a three-dimensional space.

5. The method of claim 4, further comprising verifying the calibration between the images.

6. The method of claim 5, wherein verifying the calibration includes visually inspecting the selected co-located points for misalignment within their respective two-dimensional images.

7. The method of claim 4, wherein mapping the selected points into the three-dimensional space includes:

defining the three-dimensional space from the calibrated relationships between the images; and

placing the selected points into the three-dimensional space using the co-located points as references between the images.

8. The method of claim 7, wherein defining the three-dimensional space includes creating rough object geometries.

9. The method of claim 7, further including:
selecting a second plurality of points in each of the two-dimensional images; and
mapping the second plurality of selected points into the three-dimensional space.

10. The method of claim 1, wherein creating the three-dimensional geometry includes generating a plurality of surface geometries for the object from three-dimensional data generated from the images.

11. The method of claim 10, wherein generating the surface geometries includes connecting the three-dimensional data to planar curves.

12. The method of claim 1, wherein creating a three-dimensional geometry includes:
generating a preliminary three-dimensional geometry from object from the images to define a three-dimensional space; and
generating the three-dimensional geometry from the images, the three-dimensional geometry being defined within the three-dimensional space.

13. The method of claim 12, wherein generating the preliminary three-dimensional geometry includes:
selecting a plurality of points in each of the two-dimensional images;
calibrating the relationship between the images from selected points that are co-located in more than one of the two-dimensional images; and
mapping the selected points in the calibrated two-dimensional images into the three-dimensional space.

14. The method of claim 13, wherein mapping the selected points into the three-dimensional space includes:
defining the three-dimensional space from the calibrated relationships between the images; and

placing the selected points into the three-dimensional space using the co-located points as references between the images.

15. The method of claim 13, wherein generating the three-dimensional geometry includes:

selecting a second plurality of points in each of the two-dimensional images; and

mapping the second plurality of selected points into the three-dimensional space.

16. The method of claim 1, wherein generating the three-dimensional model from the three-dimensional geometry includes:

rotating the three-dimensional geometry; and

generating a plurality of synthetic signatures of the model from a plurality of perspectives at the three-dimensional geometry is rotated.

17. The method of claim 16, where generating the synthetic signatures comprises generating a plurality of synthetic LADAR signatures.

18. The method of claim 1, wherein the images comprise three-dimensional images.

19. The method of claim 1, wherein the images comprise two-dimensional images.

20. The method of claim 1, wherein the comprise at least one of photographic images, laser radar images, synthetic aperture radar images, drawings, and infrared images.

21. The method of claim 1, wherein generating the three-dimensional model includes generating a three-dimensional model of LADAR returns from the object.

22. The method of claim 21, wherein generating the three-dimensional model of the LADAR returns for integration into the object recognition system includes generating the three-dimensional model of the LADAR returns for integration into a target recognition system.

23. The method of claim 1, wherein generating the three-dimensional model for integration into the object recognition system includes generating the three-dimensional model for integration into a target recognition system.

24. A program storage medium encoded with instructions that, when executed by a computer, perform a method for modeling an object in software, the method comprising:

generating a three-dimensional geometry of the object from a plurality of points obtained from a plurality of images of the object, the images having been acquired from a plurality of perspectives; and

generating a three-dimensional model from the three-dimensional geometry for integration into an object recognition system.

25. The program storage medium of claim 24, wherein creating the three-dimensional geometry in the encoded method includes generating the three-dimensional geometry of the object from a plurality of points obtained from a plurality of two-dimensional images of the object.

26. The program storage medium of claim 24, wherein creating the three-dimensional geometry in the encoded method includes generating a plurality of surface geometries for the object from three-dimensional data generated from the images.

27. The program storage medium of claim 24, wherein creating a three-dimensional geometry in the encoded method includes:

generating a preliminary three-dimensional geometry from object from the images to define a three-dimensional space; and

generating the three-dimensional geometry from the images, the three-dimensional geometry being defined within the three-dimensional space.

28. The program storage medium of claim 24, wherein generating the three-dimensional model from the three-dimensional geometry in the encoded method includes:

rotating the three-dimensional geometry; and

generating a plurality of synthetic signatures of the model from a plurality of perspectives at the three-dimensional geometry is rotated.

29. The program storage medium of claim 24, wherein the images comprise three-dimensional images.

30. The program storage medium of claim 24, wherein the images comprise two-dimensional images.

31. The program storage medium of claim 24, wherein the images comprise at least one of photographic images, laser radar images, synthetic aperture radar images, drawings, and infrared images.

32. The program storage medium of claim 24, wherein generating the three-dimensional model in the encoded method includes generating a three-dimensional model of LADAR returns from the object.

33. The program storage medium of claim 24, wherein generating the three-dimensional model for integration into the object recognition system in the encoded method includes generating the three-dimensional model for integration into a target recognition system.

34. A computer, comprising:

a processor;

a bus systems;

a storage with which the processor communicates over the bus system; and

a software application residing in the storage and capable of performing a method for modeling an object in software upon invocation by the processor, the method comprising:

generating a three-dimensional geometry of the object from a plurality of points obtained from a plurality of images of the object, the images having been acquired from a plurality of perspectives; and

generating a three-dimensional model from the three-dimensional geometry for integration into an object recognition system.

35. The computer of claim 34, wherein creating the three-dimensional geometry in the programmed method includes generating the three-dimensional geometry of the object from a plurality of points obtained from a plurality of two-dimensional images of the object.

36. The computer of claim 34, wherein creating the three-dimensional geometry in the programmed method includes generating a plurality of surface geometries for the object from three-dimensional data generated from the images.

37. The computer of claim 34, wherein creating a three-dimensional geometry in the programmed method includes:

generating a preliminary three-dimensional geometry from object from the images to define a three-dimensional space; and

generating the three-dimensional geometry from the images, the three-dimensional geometry being defined within the three-dimensional space.

38. The computer of claim 34, wherein generating the three-dimensional model from the three-dimensional geometry in the programmed method includes:

rotating the three-dimensional geometry; and

generating a plurality of synthetic signatures of the model from a plurality of perspectives at the three-dimensional geometry is rotated.

39. The computer of claim 34, wherein the images comprise three-dimensional images.

40. The computer of claim 34, wherein the images comprise two-dimensional images.

41. The computer of claim 34, wherein the images comprise at least one of photographic images, laser radar images, synthetic aperture radar images, drawings, and infrared images.

42. The computer of claim 34, wherein generating the three-dimensional model in the programmed method includes generating a three-dimensional model of LADAR returns from the object.

43. The computer of claim 34, wherein generating the three-dimensional model for integration into the object recognition system in the programmed method includes generating the three-dimensional model for integration into a target recognition system.

44. A method for modeling an object in software, comprising:

creating a three-dimensional geometry of the object from a plurality of two-dimensional images of the object, the images having been acquired from a plurality of perspectives; and

generating a three-dimensional model from the three-dimensional geometry for integration into an object recognition system.

45. The method of claim 44, wherein creating the three-dimensional geometry includes generating a set of three-dimensional data from a set of two-dimensional data representing the two-dimensional images.

46. The method of claim 45, wherein generating the set of three-dimensional data includes:

selecting a plurality of points in each of the two-dimensional images;

calibrating the relationship between the images from selected points that are co-located in more than one of the two-dimensional images; and

mapping the selected points in the calibrated two-dimensional images into a three-dimensional space.

47. The method of claim 46, further comprising verifying the calibration between the images.

48. The method of claim 47, wherein verifying the calibration includes visually inspecting the selected co-located points for misalignment within their respective two-dimensional images.

49. The method of claim 46, wherein mapping the selected points into the three-dimensional space includes:

defining the three-dimensional space from the calibrated relationships between the images; and

placing the selected points into the three-dimensional space using the co-located points as references between the images.

50. The method of claim 49, wherein defining the three-dimensional space includes creating rough object geometries.

51. The method of claim 49, further including:

selecting a second plurality of points in each of the two-dimensional images; and

mapping the second plurality of selected points into the three-dimensional space.

52. The method of claim 44, wherein creating the three-dimensional geometry includes generating a plurality of surface geometries for the object from three-dimensional data generated from the images.

53. The method of claim 52, wherein generating the surface geometries includes connecting the three-dimensional data to planar curves.

54. The method of claim 44, wherein creating the three-dimensional geometry includes:

generating a preliminary three-dimensional geometry from object from the images to define a three-dimensional space; and

generating the three-dimensional geometry from the images, the three-dimensional geometry being defined within the three-dimensional space.

55. The method of claim 54, wherein generating the preliminary three-dimensional geometry includes:

selecting a plurality of points in each of the two-dimensional images;

calibrating the relationship between the images from selected points that are co-located in more than one of the two-dimensional images; and

mapping the selected points in the calibrated two-dimensional images into the three-dimensional space.

56. The method of claim 55, wherein mapping the selected points into the three-dimensional space includes:

defining the three-dimensional space from the calibrated relationships between the images; and

placing the selected points into the three-dimensional space using the co-located points as references between the images.

57. The method of claim 55, wherein generating the three-dimensional geometrys includes:

selecting a second plurality of points in each of the two-dimensional images; and

mapping the second plurality of selected points into the three-dimensional space.

58. The method of claim 44, wherein generating the three-dimensional model from the three-dimensional geometry includes:

rotating the three-dimensional geometry; and

generating a plurality of synthetic signatures of the model from a plurality of perspectives at the three-dimensional geometry is rotated.

59. The method of claim 58, where generating the synthetic signatures comprises generating a plurality of synthetic LADAR signatures.

60. The method of claim 44, wherein the two-dimensional images comprise at least one of photographic images, laser radar images, synthetic aperture radar images, drawings, and infrared images.

61. The method of claim 44, wherein generating the three-dimensional model includes generating a three-dimensional model of LADAR returns from the object.

62. The method of claim 61, wherein generating the three-dimensional model of the LADAR returns for integration into the object recognition system includes generating the three-dimensional model of the LADAR returns for integration into a target recognition system.

63. The method of claim 44, wherein generating the three-dimensional model for integration into the object recognition system includes generating the three-dimensional model for integration into a target recognition system.